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FINAL REPORT  
GUISTI MINE  
CENTERVILLE  
CASCADE COUNTY, MONTANA

OCTOBER, 1985

***L. C. HANSON COMPANY***  
CONSULTING ENGINEERS & SURVEYORS  
HELENA — GREAT FALLS — GLENDIVE

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FINAL REPORT  
GUISTI MINE  
CENTERVILLE  
CASCADE COUNTY, MONTANA

OCTOBER, 1985

ATTENTION: Mr. Richard Juntunen, Chief  
Abandoned Mine Reclamation Bureau  
Department of State Lands  
1625 11th Avenue  
Helena, MT 59620

PREPARED BY: L. C. Hanson Company  
Consulting Engineers  
3108 McHugh Lane  
PO Box 299  
Helena, MT 59620

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**L. C. HANSON COMPANY**  
CONSULTING ENGINEERS & SURVEYORS  
HELENA — GREAT FALLS — GLENDIVE



## GUISTI MINE RECLAMATION

### OBJECTIVE:

The project goals were to close existing mine openings, control acid mine drainage, clean up mine wastes, and reclaim areas damaged by mining activities and runoff.

### PROJECT LOCATION:

The project site is located on Highway 227 in Cascade County, Montana, approximately 15 miles southeast of Great Falls and one-half mile south of Centerville.

### SURFACE DESCRIPTION:

The site lies on both sides of Highway 227. The area north of the highway consisted of the mine entrance, an adit which may have been an air shaft, a subsidence pit, acid mine drainage from a 2" iron pipe, and a steep hillside below the mine entrance which was covered with mine wastes, multiple erosion channels, runoff contaminated soil, some tipple ruins and other miscellaneous debris. Two mobile homes are located on pads cut into the hillside, one on each side of the waste area. The waste materials between the trailers had been graded by the landowners to produce a flat area with steep waste banks to the north and south.

The mine entrance was located approximately 400 feet north of and 90 vertical feet above the highway. The adit was approximately 50 feet east of the mine entrance. The subsidence pit was approximately 180 feet east of and 35 vertical feet above the mine entrance.

Approximately 570 L.F. of borrow ditch on the north side of the highway and 290 L.F. on the south side had been contaminated by acid mine drainage and waste materials carried by runoff.

### PROJECT PLANNING:

L. C. Hanson Company began preliminary survey and design work in the Spring of 1983. The general plan was to close all mine openings; control the flow of acid mine drainage; reroute the acid mine drainage and runoff by installing a culvert under the



highway (this would also eliminate reported overflow of the highway by runoff during cloud bursts); and reshape and reclaim all areas damaged by mine wastes and drainage.

Preliminary plans were completed in early fall of 1983. The project was put on hold because pneumatic stowing was determined to be the most feasible method of backfilling the subsidence pit and it was felt this project could be completed more economically if included with upcoming projects which would require pneumatic stowing.

On May 28, 1984, McDaniel and Sons were hired by the DSL to excavate open the mostly-closed mine entrance to determine the source of the acid mine drainage and to allow entry for determining the relation of the subsidence to the mine workings. It was determined the acid drainage was probably piped from a spring which was a considerable distance into the mine. The exact source was not determined. The mine's condition was such that personnel could not determine the relation of the subsidence to the workings.

In July, 1984, the DSL negotiated a change order with Mining Corporation, Inc., Contractor for Pneumatics Projects, Three Sites, Cascade County, P.R. 1327-G to pneumatically backfill the subsidence pit and to pneumatically place topsoil after backfilling.

After L. C. Hanson Company revised the Plans for remaining work at the GUISTI site, the project was advertised for bids and a construction Contract was awarded to Excavating Service, Belt, Montana on October 2, 1984.

#### WORK DESCRIPTION:

The Contractor started work on November 8, 1984. The Contractor installed the drain pipe and aggregate in the mine, backfilled the adit, installed the seepage interceptors and backfilled 90% of the mine opening prior to being issued a "Winter Shutdown" which was effective on November 30, 1984.

Work resumed on May 1, 1985, with the Contractor grading the ditch. On May 3, 1985, the Contractor cut into Brian Guisti's absorption field while excavating for the ditch. Change Order No. 1 was issued on May 17, 1985, to replace the absorption field.





Original work under the Contract (except for seeding, fertilizing, and mulching) was substantially completed on June 19, 1985, with one (1) day of Contract time remaining.

Additional authorized topsoiling and graveling work was completed on June 28, 1985.

On June 25, 1985, the Cascade County Road Superintendent sent notice that he would not accept the pavement patch over the 24" culvert because he felt the crown in it was a hazard. The DSL issued Change Order No. 2 authorizing the Contractor to replace the pavement patch. Replacement work was completed on August 5, 1985.

The seeding, fertilizing, and mulching was completed on October 29, 1985.

#### DISCUSSION:

Sixty-Three (63) consecutive calendar days were allowed to complete the project. The Contractor used 64 calendar days to complete the work.

The drain aggregate and collector were installed in the mine entry generally as planned. The existing 2" iron pipe was intercepted in the drain aggregate pit eliminating the need for connecting the 2" line to the new 8" drain line. The seepage interceptors and the remainder of the drainline were installed as planned.

The ditch was graded generally as planned, however, the grade was raised one foot at Station 4+70 to assure coverage over Randy Guisti's water service. Intermittent seeps appeared at several locations during construction and additional bank protection material was authorized and installed at Station 7+30 to intercept a larger seep.

Brian Guisti's absorption field was cut by ditch construction. The field was not located where records showed and also was not buried as deep as the landowner indicated. The field appeared to be saturated by acid mine drainage. The existing septic tank was used as is and a new absorption field was installed.

The planned 18-foot long twin 15" R.C.P. culvert installation was replaced by a single 36-foot long 15" R.C.P. at the request of landowner, Randy Guisti.



The DSL authorized the Contractor to place gravel on all portions of the drive-ways to the two trailers within the construction limits. The DSL also authorized the Contractor to place a 4" layer of topsoil on the limed highway ditch to assure revegetation.

COMMENTS:

The project was completed in conformance with the Contract Documents and L. C. Hanson Company has recommended acceptance of the project by the DSL.

The Contractor's order of work was not the logical one suggested in the Special Provisions. This resulted in some problems during construction.

It is felt that the project could have been completed much sooner if the Contractor had used equipment which was more appropriate in size and type, had followed a logical order of work, had worked consistent work days, had had a superintendent on site, and had generally been more organized.

Several seep areas have appeared on the hillside. The seeps are presently being intercepted by the erosion checks, however, they should be monitored and may require some action in the future.

Water from the ditch was percolating into the ground and not flowing through the 15" R.C.P. culvert. L. C. Hanson Company personnel applied bentonite to the ditch bottom and the water is now flowing down the ditch. This flow should also be monitored as the bentonite seal may not be a permanent solution.

QUANTITY SUMMARY:

Area Reclaimed	1.675 Acres
Cost Per Acre	\$ 16,970.00
TOTAL COST	\$ 28,424.50

NOTE: Detailed unit costs and complete quantity breakdowns are available in the project records.



- PHOTO SLIDE LOG -

GUISTI MINE

1. Looking north at site from across highway prior to construction. 11-8-84.
2. Looking north at site from across highway prior to construction. 11-8-84.
3. Looking NE at site prior to construction. 11-8-84.
4. Looking west down highway ditch from west GUISTI approach prior to construction. 11-8-84.
5. Mine entrance. 11-8-84.
6. Looking into mine. Stake is at Station 8+23 after coal cars have been removed. 11-8-84.
7. Al Hanson building work platform at mine entrance. 11-8-84.
8. Coal cars recovered from mine. Building platform in background by mine entrance.
9. East GUISTI approach looking NW. 11-8-84.
10. Slack bank beside highway looking NW. 11-8-84.
11. Looking north at bank beside highway. 11-8-84.
12. Looking north along west side of area. 11-8-84.
13. Looking NE at bank above drive. 11-8-84.
14. Looking NE at adit and winch. Work platform being built at left. 11-8-84.
15. Looking towards mine entrance at existing iron pipe draining water from mine. 11-8-84
16. Looking north at area disturbed to set loader upright (blackest area at center of photo) 11-12-84
17. Looking north at area disturbed to left of mine when setting dozer upright. 11-12-84
18. Looking north at winch and carriage for coal car after moving to bottom of slope. 11-12-84.
19. Looking north at winch and carriage for coal car after moving to bottom of slope. 11-12-84.
20. Looking NE at backfilled adit. 11-12-84.
21. Looking north at excavation around mine entrance. 11-12-84.
22. Looking west at excavation to gain access to mine. 11-12-84.



23. Mine entrance excavated to expose coal car rails. 11-12-84.
24. Collection pit excavated in mine. 11-12-84.
25. Intercepted 2" iron pipe. (center of photo below Virgil Hanson, dark looking spot). 11-12-84.
26. Looking south from just inside mine at exposed rails and water flow. 11-12-84.
27. Tracked loader/backhoe sitting in mine entrance. 11-12-84.
28. Assembling 8" tee collector in mine. 11-12-84.
29. Laying 8" drain pipe in mine entrance, bedding in granular bank material. 11-12-84.
30. Birds (center of photo) observing destruction of nesting area. 11-12-84.
31. Slide damaged.
32. Backfilling mine entrance. 11-13-84.
33. Borrowing backfill material from bank to west of mine entrance (looking west). 11-13-84.
34. Installing Miradrain panels at 7+22. (Panel is leaned uphill while fabric is taped around drain pipe). 11-13-84.
35. Miradrain panels and drain pipe at 7+22. 11-14-84.
36. Miradrain panels bolted together at Station 7+22. 11-14-84.
37. Backfilling Miradrain panels. (Looking west at Station 7+22). 11-14-84.
38. Assembling Miradrain panels and drain pipe for Station 7+20. 11-14-84.
39. Assembling Miradrain panels and drain pipe for Station 7+20. 11-14-84.
40. Looking west at trenching for seepage interceptor at Station 7+22. 11-14-84.
41. Looking east at installed interceptor panels at Station 7+22. 11-15-84.
42. Looking east at installed interceptor panels at Station 7+22. 11-15-84.
43. Track loader working in mine entrance. 11-15-84.
44. Drain gravel in collection pit, looking into mine. 11-15-84.
45. Looking into mine entrance. 11-16-84.
46. Pushing material uphill to backfill mine entrance (looking SW). 11-21-84.
47. Partially filled mine entrance. 11-21-84. (looking NW, backfilled adit at right).





48. Partially filled mine entrance and adit, looking NE. 11-21-84.
49. Mine entrance backfill. 11-21-84.
50. Outfall of drain pipe (by post) looking southerly. 11-21-84.
51. Pushing backfill material uphill. 11-21-84.
52. Looking NE at project. 11-21-84.
53. Looking north - placing backfill at mine entrance. 11-28-84.
54. Looking NW at dozer pushing material into mine entrance. 11-28-84.
55. Moving material uphill with hoe. 11-28-84. Looking NW - mine entrance is to the right.
56. Looking NW at placement of backfill of mine entrance. 11-28-84.
57. Pushing material to compact fill at mine entrance. 11-28-84.
58. Looking downhill at rough excavating of ditch. 11-28-84.
59. Rough cut drain ditch (pipe end at shovel). 11-28-84.
60. Looking west at dozer stuck trying to excavate ditch. 11-28-84.
61. Looking NW at dozer attempting to excavate ditch. 11-28-84.
62. Looking NE at backfill at mine entrance. 11-30-84.
63. Backfill at mine entrance (entrance is at right). 11-30-84.
64. Material excavated and pushed to bottom of hill. Runoff frozen in front of dozer. 12-4-84.
65. Looking uphill at rough cut ditch. 12-4-84.
66. Looking north at slope. 12-11-84.
67. Looking west at dozer pushing spoil materials between trailers. 5-3-85.
68. Looking west at dozer pushing spoil materials between trailers. 5-3-85.
69. Bank cut behind Randy Guisti trailer and pushed to enlarge trailer pad. Not this Contract. 5-3-85.
70. Looking northeast at west driveway, dozer pushing spoil material at right and privately enlarged trailer pad area at left. 5-3-85.
71. Looking up rough graded ditch from Station 5+25<sup>+</sup>. 5-3-85.
72. Three Rivers Telephone Co-op installing aerial service to Brian Guisti trailer. 5-17-85.



73. Looking south down ditch preparing for 15" culvert installation. 5-17-85.
74. Looking east at existing Brian Guisti septic tank and outlet. 5-17-85.
75. Trenching for new drain field for Brian Guisti. 5-21-85.
76. Dozer pushing spoil material over bank (looking west). 5-21-85.
77. Looking east at existing Brian Guisti septic tank. 5-21-85.
78. Looking east at existing Brian Guisti septic tank. 5-21-85.
79. Looking north at hoe excavating for Brian Guisti drainfield, drain ditch just left of photo center. 5-21-85.
80. Installing Brian Guisti drainfield. 5-22-85.
81. Installing Brian Guisti drainfield. 5-22-85.
82. Installing Brian Guisti drainfield. 5-22-85.
83. Installing Brian Guisti drainfield. 5-23-85.
84. Backfilled drainfield for Brian Guisti, looking east. 5-23-85.
85. Looking westerly at dozer pushing spoil material over bank. 5-23-85.
86. Looking northeast at material dozed in between highway and driveways. 5-23-85.
87. Looking north at dozer trying to shape ditch. 5-24-85.
88. Patching 15" RCP pipe. 5-24-85.
89. Patching existing 15" RCP pipe. 5-24-85.
90. Looking southeast across area graded between highway and driveways. 5-24-85.
91. Looking east at salvaged 15" RCP, lime spreader and disc. 5-24-85.
92. Backfilling 15" RCP pipe (looking south). 5-24-85.
93. Looking uphill at ditch when Contractor requested to be allowed to place lime. "V" ditch not yet formed and no rock placed. 5-24-85.
94. Lime dumped on ground. 5-28-85.
95. Discing prior to liming. 5-28-85.
96. Looking northwest at lime spreading and discing. 5-28-85.
97. Unloading excavator. 5-28-85.
98. Looking southeast at highway ditch shaping. 5-28-85.
99. Looking east at excavator shaping highway ditch. 5-28-85.



100. Looking northerly at liming and discing. 5-28-85.
101. Rain water accumulation in highway ditch (looking east) following storm. 5-28-85.
102. Rain water at 15" culvert. 5-28-85.
103. Looking southwest at cut through Randy Guisti driveway to drain rain water. 5-28-85.
104. Looking northeast at dozer pushing wet lime material up hill. 5-28-85.
105. Outlet of 15" RCP crushed by dozer. 5-29-85.
106. Blacker area on hill is where lime was dozed up hill. 5-29-85.
107. JD 450 Dozer and one-way disc. 6-6-85.
108. Mel Rennick stuck in his pickup after trying to come down hill. 6-6-85.
109. Mel Rennick stuck in his pickup after trying to come down hill. 6-6-85.
110. Placing bank protection and cutting ditch. Loader threw track. 6-7-85.
111. Reliming. 6-10-85.
112. Looking northeast at highway signing for 24" culvert installation. 6-11-85.
113. Looking east at pavement cutting for 24" culvert installation and flagman. 6-11-85.
114. Cutting pavement for 24" culvert installation. 6-11-85.
115. Looking west - removing asphalt for 24" culvert installation. 6-11-85.
116. 24" culvert installation. 6-11-85.
117. 24" culvert installation. 6-11-85.



- 118. 24" RCP culvert installation. 6-11-85.
- 119. 24" RCP culvert installation. 6-11-85.
- 120. Barricades w/flashers left to mark culvert ditch overnight. 6-12-85.
- 121. Compacting gravel backfill over 24" RCP. 6-12-85.
- 122. Watering detour with Guisti garden hose. 6-12-85.
- 123. Cutting edges of asphalt for 24" culvert ditch patch. 6-12-85.
- 124. Looking south at B & T Paving patching highway. 6-13-85.
- 125. B & T Paving rolling patch in asphalt for 24" RCP crossing. 6-13-85.
- 126. Completed pavement patch. 6-13-85.
- 127. Inlet end of 24" RCP culvert. 6-14-85.
- 128. Gravel over where culvert had been in Randy Guisti's approach. 6-14-85.
- 129. Rock lining in ditch above 24" RCP. 6-14-85.
- 130. Seep area on east side of ditch at Station 7+30  $\pm$ . 6-14-85.
- 131. Seep area on east side of ditch at Station 7+30  $\pm$ . 6-14-85.
- 132. Rock placed in seep area on east side of ditch Station 7+30  $\pm$ . 6-14-85.
- 133. Placing topsoil with dozer. 6-15-85.
- 134. Placing topsoil with dozer. 6-15-85.
- 135. Placing topsoil with dozer and erosion check, looking east. 6-15-85.
- 136. Load of topsoil on Mack truck. 6-15-85.





137. Load of topsoil on Mack truck. 6-15-85.
138. Topsoil piles and placing topsoil with dozer. 6-15-85.
139. Topsoil piles and placing topsoil with dozer. 6-15-85.
140. Topsoil placed on 6-15-85. 6-17-85.
141. One-ton truck stuck in ditch by outlet of 15" RCP. 6-17-85.
142. Placing topsoil with HD-11 Dozer. 6-17-85.
143. Placing topsoil with HD-11 Dozer. 6-17-85
144. Applying lime along edge of highway between driveways, looking south.
145. Applying lime on east side of ditch between driveways and highway. 6-17-85.
146. Applying lime on east side of ditch between driveways and highway. 6-17-85.
147. Looking northwest at liming between driveway and highway, west of ditch.  
6-17-85.
148. Placing topsoil near top of hill. 6-18-85.
149. Discing lime (looking NW) between driveway and highway.
150. Looking north at topsoil placing between driveway and highway.
151. Discing north highway ditch to prepare for liming. 6-18-85.
152. Looking west at liming south highway ditch (north ditch previously limed).  
6-19-85.
153. Roller for compacting driveways. 6-19-85.
154. Placing topsoil with JD 450. 6-19-85.
155. West driveway graveled. 6-21-85.



156. Topsoil along ditch above 24" RCP. 6-21-85.
157. Top west drive looking east after gravel placing. 6-21-85.
158. Looking up ditch after topsoiling and erosion check digging out. 6-21-85.
159. Erosion check complete. 6-21-85.
160. Looking south over completed gravel, topsoil and erosion checks. 6-26-85.
161. Looking north at completed project from across highway. 6-26-85.
162. Looking north at completed project with outlet of 24" RCP in foreground.  
6-26-85.
163. Topsoil piled in highway ditches. 6-28-85.
164. Looking northeast at topsoil piles in south highway ditch. 6-28-85.
165. Looking northeast at topsoil piles in north highway ditch. 6-28-85.
166. Looking northeast at site and 45 MPH speed limit sign. 6-28-85.
167. Looking uphill from 15" RCP culvert at water in bentonite lined ditch.  
6-28-85.
168. Looking downhill at 15" RCP culvert and bentonite lined ditch. 6-28-85.
169. Looking northeast at seep above bottom east erosion check. 7-31-85.
170. Looking northwest at seep above bottom west erosion check. 7-31-85.
171. Looking east at bottom erosion checks showing seeps on left. 7-31-85.
172. Looking down ditch at seeps along ditch. 7-31-85.



173. John Gordon removing pavement patch. 8-5-85.
174. John Gordon removing pavement patch. 8-5-85.
175. Excavating Service crew compacting subbase after pavement removal. 8-5-85.
176. Placing second (final) lift of asphalt and rolling pavement patch. 8-5-85.
177. Placing final lift of asphalt on pavement patch. 8-5-85.
178. Placing final lift of asphalt on pavement patch. 8-5-85.
179. Hydro-seeding, seed on upper slope.
180. Hydro-seeding, seed on lower slope.
181. Hydro-seeder.
182. Disking after fertilizer placed prior to seeding.
183. Dozer tracking seeded area.
184. Upper slope after mulch.
185. Lower slope after mulch.





